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(54) Pulsed energy stimulator device

(57) The device 6 stimulates an individual's skin by producing pulsed electrical 12, 14, magnetic 46, 48 and light 16 energy fields on the area to be treated through a transparent electrical insulating shield 10 and simultaneously passing charged ions 40 over the area. A sequence of frequencies and intensities for the light is described. This has beneficial cosmetic and therapeutic effects, such as promoting hair growth.

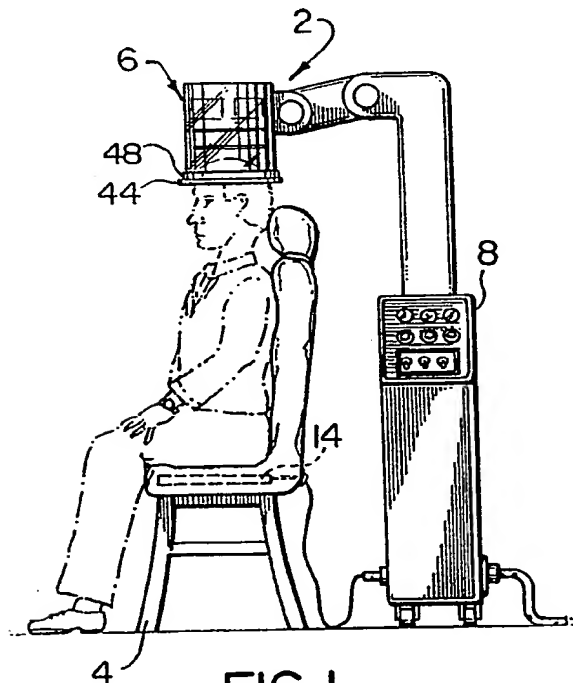


FIG. 1

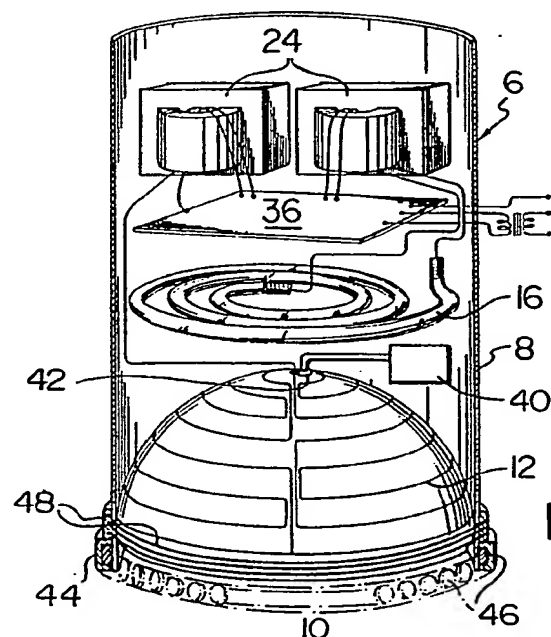


FIG. 2

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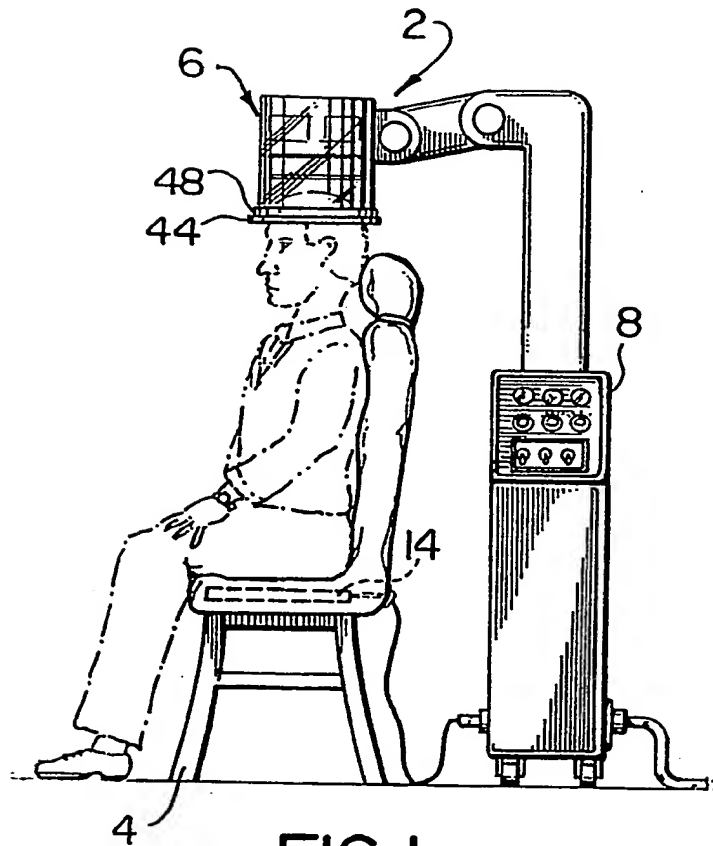


FIG. 1

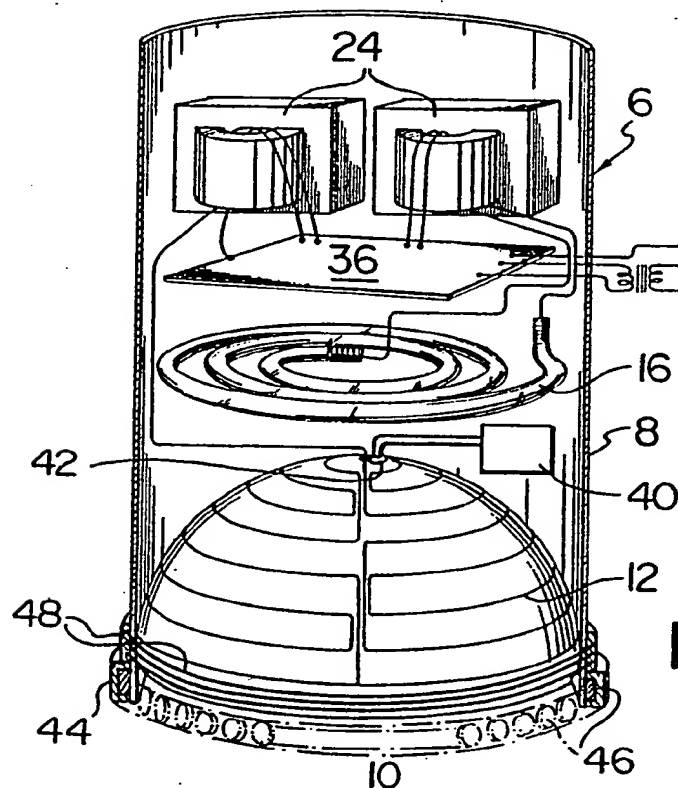


FIG. 2

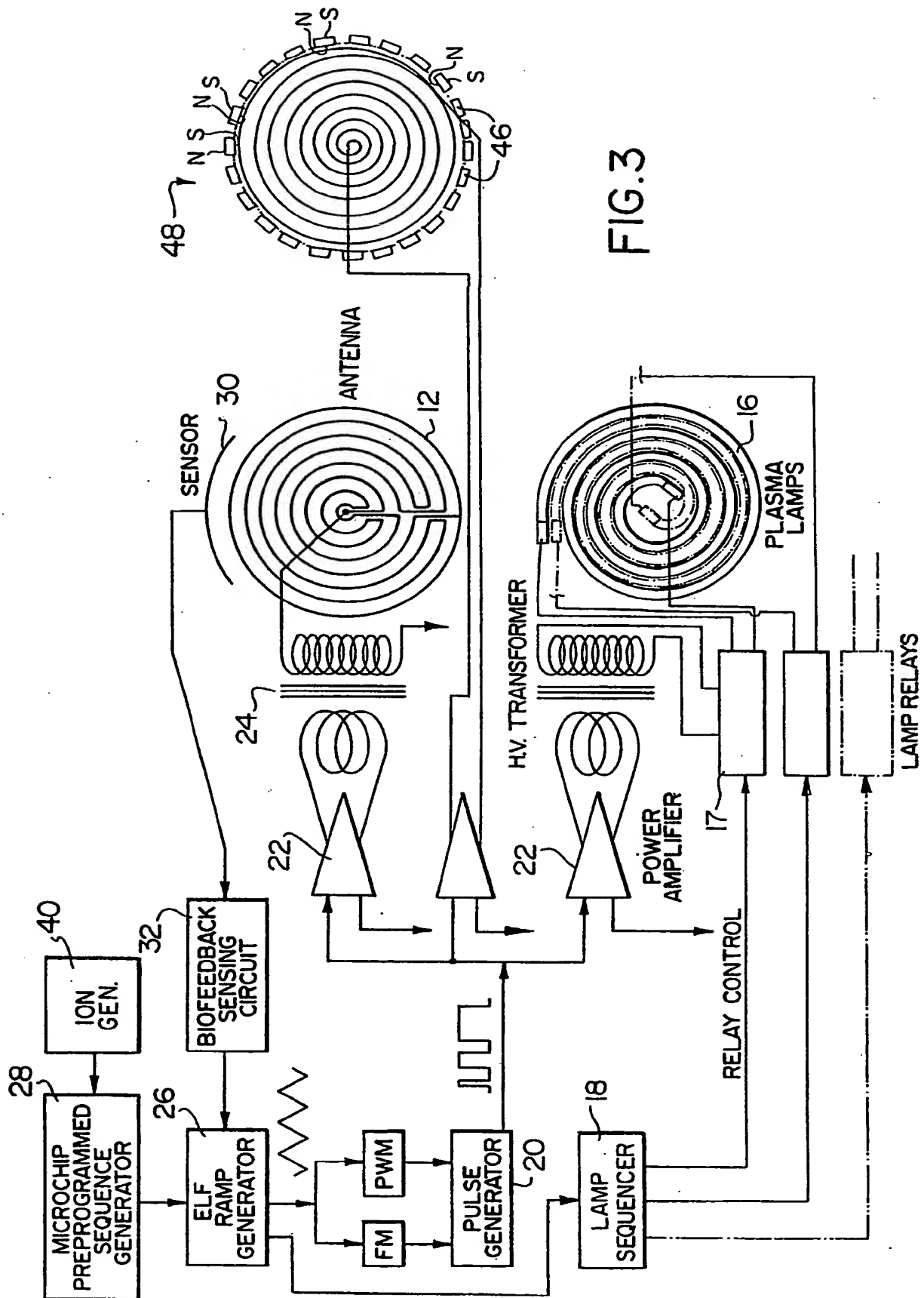


FIG. 3

**TITLE OF THE INVENTION**

**PULSED ENERGY STIMULATOR DEVICE**

**FIELD OF THE INVENTION**

The present invention relates to a device for stimulation of an individual's skin for  
5 beneficial cosmetic or therapeutic purposes. More particularly the device of the present  
invention uses light, electrical and magnetic energy and charged ions to produce this stimulation.

It has been well established by bio-medical scientists that wounded bone and soft  
body tissues respond well to various kinds of energy stimulation (magnetism, electric fields,  
light, vibration, ultrasound). Despite the considerable scientific literature on the subject however  
10 it is still unclear how such stimulation works. Certainly the electrical fields alter the ability of  
cell membranes to allow charged ions (especially sodium, potassium, calcium and chlorides) to  
pass through. Additionally, it is known that cell membranes are examples of liquid crystals  
whose helical protein molecules become realigned (orthorotated) by an electric field.

In the case of hair follicle cells, in the July - August 1990 issue of The  
15 International Journal of Dermatology, at pages 446 to 450, a paper by Stuart Maddin, Peter Bell  
and John James describes a controlled study which demonstrated the positive biological effect  
On hair regrowth of a pulsed electrical field administered according to a regularized treatment  
scheduled over thirty-six weeks. The rationale of that phenomenon was unclear to the authors,  
but they speculated that the hair regrowth was due to an electrophysiological effect on the  
20 quiescent hair follicles, similar to that documented by others with respect to bone fracture and  
soft tissue repair enhancement. Their apparatus comprised a hood containing electrical output

plates connected to electronic circuitry and a rechargeable 12 volt battery within a lower stand.

### **SUMMARY OF THE INVENTION**

In accordance with the present invention there is provided a device for stimulating an area of an individual's skin, the device comprising a low frequency field electrical field generation means, a permanent magnet magnetic field generation means, a magnetic field generation means, a charged ion generating means and a light generation means. The light generation means delivers light diffused over the entire area of the skin to be stimulated. The ion generation means delivers charged ions to be blown over that area of the skin. An antenna means fits over the area of the skin to be stimulated, the antenna means electronically associated with the electrical field generation means to cause that area to act as the plate of a capacitor to deliver electrical energy to that area of the skin. Pulse generation means are electronically associated with the electrical and magnetic field generation means and light generation means so that the electrical and magnetic fields and light are generated synchronously or alternately in low frequency pulses. A transparent electrical insulating means is positioned to separate the antenna and other means from direct contact with the area of skin to be stimulated, the electrical insulating means having dielectric capacitive properties.

In a preferred embodiment of the present invention, adapted to slow the deterioration of hair follicles and to begin new hair growth on an individual's scalp, the antenna means is of hemispherical concave shape to fit over the individual's scalp. The pulse generation means during operation drives a high voltage transformer which in turn supplies the antenna so that an electric field on the individuals scalp is such as to be measurable as a voltage through a load of ten kilo-ohms to ground having a maximum peak value of 120 volts, and a minimum

value of 50 volts. As well the light generation means comprises a plurality of plasma lamps of different colour, the plasma lamps being driven by the single generator of pulse wave form, with a relay switching each lamp on in predetermined sequence.

While the device according to the present invention is particularly well adapted to cause hair follicles to slow their deterioration and to begin new hair growth on an individual's scalp, other possible applications of the present invention in its broadest sense are envisaged as follows:

- 1) Healing of superficial skin wounds, inflammations, ulcers and dermatoses;
- 2) Healing of various diseases of peripheral blood vessels;
- 3) Facilitating healing of rheumatoid arthritis;
- 4) Alleviation of symptoms of migraine;
- 5) Reducing generalized body pain;
- 6) Facilitating withdrawal and rehabilitation in addiction to drugs and alcohol;
- 7) Assisting the body's immune system response in resisting the damaging effects of the AIDS virus; and
- 8) Alleviating symptoms of psychological depression and some forms of schizophrenia.

It is an object of the present invention particularly to provide an improved device which will effectively stimulate an individual's skin for the purpose of causing hair follicles to slow their deterioration and to begin new hair growth.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

These and other objects and advantages of the invention will become apparent upon reading the following detailed description and upon referring to the drawings in which:

FIGURE 1 is a perspective view of an arrangement of the device in accordance with the present invention specifically adapted to treat an individual's scalp for stimulating hair follicles to produce reduced hair loss and increased hair growth, incorporating a seat for the individual during treatment;

FIGURE 2 on the second page of drawings is a schematic elevation view, in partial section, of the upper portion of the device of Figure 1; and

FIGURE 3 is a block diagram of the electrical and other components of the device of FIGURE 1.

While the invention will be described in conjunction with an example embodiment, it will be understood that it is not intended to limit the invention to such embodiment. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

### **DETAILED DESCRIPTION OF THE INVENTION**

In the drawings similar features have been given similar reference numerals. Turning to the drawings, there is illustrated in Figure 1 a device 2 in accordance with the present invention, specifically arranged for stimulating the hair root and follicle cells on an individual's scalp. The individual is seated on a chair 4, over which a hood arrangement 6, which will be described in more detail hereinafter, is positioned, with a control panel 8 governing the operation

of the components of hood 6.

As can be seen in Figure 2, hood 6 comprises a cylindrical plastic case 8 within which is positioned, at the lower end, a dielectric transparent hemisphere 10, intended to be positioned over the individual's scalp during treatment (FIGURE 1). On top of the dielectric hemisphere, mounted on the convex inner surface thereof is a wire loop or mesh antenna 12 preferably having from 7 to 50 concentric circular loops each interconnected to the other loops in a Mobius circuit, as illustrated, with wiring such that current through adjacent turns travels in opposite directions. In this way there is cancellation of hertzian radiation and magnification of the scalar energy (thought to have greater healing effect than conventional electro-magnetic (Hertzian) waves). By mounting antenna loops 12 on the convex inner surface of the hemispherical dielectric, the individual scalp is separated from direct contact with any electrical conductors. In this fashion the patient's scalp forms the receiving plate of a capacitor. A grounding conductive pad 14 (FIGURE 1) built into the seat portion of chair 4 further increases the efficiency of this capacitive energy transfer.

It is intended that the intensity of the electric field on the subject's side (concave side) of the glass dielectric will be such as to be measurable as a voltage through a load of 10 kilo-ohms to ground having a maximum peak value of 120 volts, a minimum of 50 volts and preferably 100 volts.

The dielectric hemisphere 10 is made of a transparent non-flammable material having high energy insulation properties and a high dielectric constant in the order of 5 to 8. The dielectric hemisphere is intended as a barrier which serves the purposes of:

- 1) Diffusing and spreading the electric field;



- 2) Acting as a high-pass filter by allowing only high frequency wave forms thus reducing the possibility of 60 Hz energy being radiated to the subject;
- 3) Ensuring complete insulation and isolation of the individual being treated from any electrical conductors whatsoever.

5                    The antenna wire can be of any conductive metal wire or mesh or metallic paint but more effectively radiates scalar waves if made of brass.

                  Above antenna wires 12 within plastic hood 6 above dielectric hemisphere 10 is positioned a plurality of plasma lamps 16. Plasma lamps 16 act as a photostimulator when supplied by a source of pulsed high voltage energy at correct frequencies. Each plasma lamp 10 16 is a tube filled with a mixture of gasses at low pressure. The lamp is electrically pulsed, as will be described in more detail hereinafter, synchronously or alternately with electric field pulses passed through antenna wires 12 to provide an effect which is similar to treatment of skin by soft laser, a procedure commonly used in physiotherapy clinics today. The plasma lamps are controlled by relays 17 and lamp sequencer 18 as illustrated.

15                   Several specially constructed plasma lamps may be used, depending on the phase of a treatment for an individual. For example, for the first 10 sessions a green lamp of maximum wave length  $\lambda = 570$  nm and minimum  $\lambda = 500$  nm and preferably 525 nm may be used, for the next 10 sessions a blue lamp of maximum  $\lambda = 490$  nm and a minimum  $\lambda = 460$  nm and preferably  $\lambda = 475$  nm may be used and for the next 10 sessions a violet lamp of 20 maximum  $\lambda = 450$  nm and minimum  $\lambda = 400$  nm and preferably  $\lambda = 425$  nm may be used. For some subjects, treatment may consist of applying two or three colours sequentially during each session. All lamps have an instantaneous power ranging from 50 watts at the highest frequency to 120 watts at the lowest repetition rate.

In addition, as can be seen in Figure 3, device 2 is provided with a single generator of pulse wave form 20 which drives two power amplifiers 22 and high voltage transformers 24 which in turn supply sub-audio and audio frequency energy to antenna 12 and plasma lamp 16.

5           The wave form is a stream of repetitive pulses whose inter-pulse interval and pulse width are both modulated up and down by an extra-low frequency (ELF) ramp generator 26. At the low end, the pulse width can be a maximum of 10 milliseconds (ms), a minimum of 1 ms and preferably 5 ms, with an interval between pulses of a maximum of 10 seconds, a minimum of 0.5 seconds and preferably 3 seconds. These turn out to be the optimum value to elicit the  
10       acupuncture endorphin release response.

          At the high end, the pulse width can be a maximum of 0.3 ms, a minimum of 0.1 ms and preferably 0.2 ms, with an inter-pulse interval having a maximum value of 10 ms, a minimum of 1 ms and preferably 6 ms, which corresponds to a frequency of 166.6 Hz. This wide range of pulse width modulation and frequency modulation elicits several beneficial  
15       endorphin, cortisol and neurological effects known to promote widespread healing and regeneration of body organs and emotional states in addition to local effects on hair follicles.

          As the pulses pass through the transformer 23 and coiled antenna 12, various resonances are introduced by virtue of the inductances and capacitances thereof. By this mechanism, multiple waves having discrete predetermined higher audio frequencies are emitted  
20       by the antenna.

          The ELF ramp generator 26 has a rate and range determined not only by the pre-designed circuit components and preprogrammed microchip sequence generator 28. It also responds to changes in load parameters by virtue of a signal fed back from sensor 30 at the antenna, through bio-feedback sensing circuit 32 to further modulate the ELF generator 26.

When the load is heavier, i.e. lower resistance, this indicates analogously with the Galvanic Skin Response (G.S.R.) an increased state of anxiety or psychological tension in the subject. There is then fed back to the ELF generator 26 a signal which keeps the pulse frequency more at the higher end (which is known to have more beneficial effects on anxiety and depression). In this way, the ongoing bio-electrical status of the scalp tissue has a modifying effect such that the optimum frequency range is provided through biofeedback.

In construction, bio-feedback sensing circuit 32, ELF ramp generator 26 micro chip programmed sequenced generator 28 and pulse generator 20 may be incorporated in circuit board 36 (Figure 2) as illustrated.

Also within case 8 or associated therewith is an ion generation source 40 by which a stream of air is blown through the high voltage antenna chamber and exits via an orifice 42 at the apex of hood 6. Both positively and negatively charged air ions and a small amount of ozone (less than .01 parts per million) are thus blown over the scalp of the client.

Finally, magnetic fields are generated for the device 2 as follows. Firstly, a ring 44 of small magnets 46 with opposite polar orientation as illustrated (Figure 3) is attached to hood 6 just beneath the antenna and encircles the scalp thus generating a static magnetic field. Secondly, a coil of insulated wire 48 having a number of turns is attached over the same area where the magnets are attached. A low voltage, high current pulsed wave form is passed through this coil thus generating a pulsed electro-magnetic field encircling the scalp.

In operation, pulse generator 20 produces pulses of electric and light energy emanating through the transparent dielectric hemisphere 10 which separates the patient from antenna 12. The patient's scalp forms the other plate of a capacitor. In this way ionizable molecules are forcibly pushed through cell membrane channels in the scalp, increasing the likelihood of them remaining open.

The physiological mechanism is thought to be as follows: the abrupt turning on and off of the electrical stimulus at the antenna 12 causes alternate polarizing and depolarizing of the root and follicle cells stimulating the production of DNA and new protein synthesis while also stimulating mechanical contraction of the arrector pili muscle at the base of each follicle.

5 As previously indicated, the lamp is electrically pulsed synchronously with the electric field pulses to provide an effect similar to treatment of skin by soft laser.

Thus there has been provided in accordance with the invention a device for stimulation of an individual's skin for beneficial cosmetic or therapeutic purposes that fully satisfies the objects, aims and advantages set forth above. While the invention has been  
10 described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications and variations as fall  
15 within the spirit and broad scope of the invention.

**CLAIMS:**

1. A device for stimulating an area of an individual's skin, the device comprising:
- (a) a low frequency electrical field generation means;
  - (b) a permanent magnetic field generation means;
  - 5 (c) an induction coil magnetic field generation means;
  - (d) light generation means to deliver diffused light energy over the entire area of the skin to be stimulated;
  - (e) charged ion generation means to deliver charged ions to be blown over that area of the skin;
  - 10 (f) antenna means to fit over that area of the skin, the antenna means electronically associated with the electrical field generation means to cause that area to act as a plate of a capacitor to deliver electrical energy to that area of the skin;
  - 15 (g) pulse generation means electronically associated with the electrical and magnetic field generation means and light generation means so that the electrical and magnetic fields and light are generated synchronously or alternately in low frequency pulses; and
  - (h) transparent electrical insulating means positioned to separate said other means from direct contact with the area of skin to be stimulated, the  
20 electrical insulating means having dielectrical passative properties.

2. A device according to claim 1 adapted to stimulate root and follicle cells of an individual's scalp, the antenna means being of hemispherical concave shape to fit over the individual's scalp.

3. A device according to claim 2 wherein said electrical insulating means is of glass construction having high electrical insulation properties and a dielectric constant in the range of 5 to 8.

4. A device according to claim 2 wherein the pulse generation means during operation drives a high voltage transformer which in turn supplies the antenna so that an electric field on the treatment side of the antenna is such as to be measurable as a pulsed voltage through a load of ten kilo-ohms to ground having a maximum peak value of 120 volts, and a minimum value of 50 volts.

5. A device according to claim 4 wherein the measurable voltage is 100 volts.

6. A device according to claim 4 wherein the light generation means is a photostimulator supplied by a source of pulsed high voltage energy at predetermined frequencies.

7. A device according to claim 6 wherein the photostimulator is a plurality of plasma lamps of different colours, the plasma lamps being driven by the single generator of pulse wave form with a relay to switch each lamp on in predetermined sequence.

8. A device according to claim 7 wherein during operation selected ones of the plasma lamps are electrically pulsed synchronously with the voltage transformer.

9. A device according to claim 7 wherein the plasma lamps are adapted to operate at a power in the range of from about 50 watts to about 120 watts and generates light of wave  
5 length in the range of from about 400 nm to about 570 nm.

10. A device according to claim 7 wherein the plasma lamps are adapted to operate at a power in the range of from about 50 watts to about 120 watts and generates light of wave length in the range of from about 400 nm to about 570 nm and wherein the measurable voltage on the treatment side of the antenna is 100 volts.

10 11. A device according to claim 7 wherein the pulse wave form generator is adapted to produce a stream of repetitive pulses whose inter-pulse interval and pulse width are modulated up and down by an extra low frequency ramp generator.

12. A device according to claim 11 wherein the pulse width at the low end of light and electrical energy is in the range of about 1 to about 10 milliseconds with an interval between  
15 pulses of between about .05 seconds and about 10 seconds, and at the high end a pulse width of between .1 milliseconds and about .3 milliseconds and an interval between pulses of between about 1 milliseconds and 10 milliseconds.

13. A device according to claim 12 wherein the pulse width is about 5 milliseconds with an interval between pulses of about 3 seconds, at the low end of the light and electrical energy provided, and a pulse width of about .2 milliseconds and an interval between pulses of about 6 milliseconds at the high energy end.

5 14. A device according to claim 10 wherein the pulse wave form generator is adapted to produce a stream of repetitive pulses whose interval and pulse width are modulated up and down by an extra low frequency ramp generator.

10 15. A device according to claim 14 wherein the pulse width at the low end of light and electrical energy is in the range of about 1 to about 10 milliseconds with an interval between pulses of between about .05 seconds and about 10 seconds, and at the high end a pulse width of between .1 milliseconds and about .3 milliseconds and an interval between pulses of between about 1 milliseconds and 10 milliseconds.

15 16. A device according to claim 15 wherein the pulse width is about 5 milliseconds with an interval between pulses of about 3 seconds, at the low end of the light and electrical energy provided, and a pulse width of about .2 milliseconds and an interval between pulses of about 6 milliseconds at the high energy end.

17. A device according to claim 11 further comprising a signal feedback means from the antenna electrically associated with the ramp generator and means to alter the rate and range of pulses generated thereby in accordance with signals received from said signal feedback means.



18. A device according to claim 7 wherein the plasma lamps are tubes filled with a mixture of gases at low pressure and electrically pulsed synchronously with the electric field pulses to provide an effect similar to soft laser treatment, the lamps each having an instantaneous power ranging from about 50 watts at the highest frequency to about 120 watts at the lowest frequency.

19. A device according to claim 2 wherein the antenna means comprises a wire loop having a plurality of concentric circles each interconnected to the other circles in a Mobius circuit and arranged so that current through adjacent loops travels in opposite directions whereby Hertzian radiation is canceled.

20. A device according to claim 19 wherein the antenna loops are mounted on the convex inner surface of the hemispherical dielectric which separates the individual's scalp from direct contact with electrical conductor, whereby the individual's scalp forms the receiving plate of a capacitor.

21. A device according to claim 20 wherein a seat means is provided for the individual to be seated during operation of the device and wherein a grounding conductive pad is built into the seat means to further increase the efficiency of capacitive energy transfer to the individual's scalp.

22. A device as claimed in claim 1, substantially as described herein with reference to and as illustrated by any one of the examples shown in the accompanying drawings.

**Patents Act 1977**

**Examiner's report to the Comptroller under  
Section 17 (The Search Report)**

- 15 -

Application number

GB 9225139.6

**Relevant Technical fields**

(i) UK Cl (Edition L ) A5R (RHXT)

(ii) Int Cl (Edition 5 ) A61N (1/40 1/44 2/00 5/06)

**Search Examiner**

PAUL NICHOLLS

**Date of Search**

9 FEBRUARY 1993

**Databases (see over)**

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Documents considered relevant following a search in respect of claims 1-22

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	WO 90/00419 A1 (HENRY AND BERARD) whole document	1

SF2(p)

HCS - doc99\fil000914

Category	Identity of document and relevant passages - 16 -	Relevant to claim(s)

### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**&:** Member of the same patent family, corresponding document.

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